

## ABSTRACT OF THE DISCLOSURE

An apparatus for containing and cooling enriched water for the production of activated fluorine ( $^{18}\text{F}$ ). A target assembly is fabricated with internal cooling channels having minimal conduction paths and high Reynolds number flows. In one embodiment, the target assembly is fabricated of tantalum, which has superior oxidation resistance over silver. The superior oxidation resistance and increased cooling capacity allows for high beam currents.